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REGIONAL CEREBRAL BLOOD FLOW ANALYSIS OF VASCULAR DEMENTIA BY Xe-133 INHALATION METHOD AT THE CHRONIC STAGE.

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Forty-two cases of ischemic cerebrovascular disease were investigated using the Xe-133 inhalation method. Twenty-nine were male and thirteen were female. Sixteen had cerebrovascular dementia and twenty-six had nondementia infarction. Two criteria were necessary for a diagnosis of cerebrovascular dementia;1) the presence of cerebrovascular disease and 2) a score of less than 21.5 on Hasegawa's dementia scale. By computed tomographic findings all cases were classified into three groups; lesion on a right hemisphere, a left hemisphere and bilateral hemispheres. Regional cerebral blood flow (CBF) was calculated by 2-compartmental analysis method.

The results were as follows;
(1)Cases of cerebrovascular dementia tended to have a lower mean CBF value.
(2)A comparison of variation ratio revealed lower values in the both hemispheres on the dementia cases.
(3)Regional CBF patterns showed lower values in the central area for cases of chronic stage on dementia cases.

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I-123IMP REGIONAL CEREBRAL BLOOD FLOW IMAGES OF PATIENTS WITH ACUTE LYMPHOBLASTIC LEUKEMIA-COMPARISON WITH INTRACEREBRAL CALCIFICATION ON X-ray CT-.

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Intracerebral calcification is one of the complications of prophylactic cranial radiation and intrathecal methotrexate(MTX) treatment for patients with acute lymphoblastic leukemia(ALL), and reported as mineralizing microangiopathy with dystrophic calcification. This complication is clinically significant because of neurologic disturbances accompanied it, but its exact pathological and physiological nature remains unclear. Of 128 children with ALL received prophylactic cranial radiation and intrathecal MTX treatment, 8 were found to have intracerebral calcifications on X-ray CT. I-123 IMP was administrated to 7 of them and SPECT images of regional cerebral blood flow (rCBF) were constructed. In 3 cases with relatively large lesions with calcification, correspnding focal decreased accumulations were found. Those 3 cases had significant EEG abnormalities, dementia and epilepsy, but other 4 cases without evidence of decreased rCBF did not have epilepsy. This method was considered to be useful for physiological evaluation of intracerebral calcification in patients with ALL and have potentialities to be a useful method to evaluate other cerebral complications of ALL such as cerebral atrophy and leukoencephalopathy.

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CLINICAL EVALUATION OF ^{123}I-IMP SPECT IN BRAIN TUMORS.

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I-123 IMP cerebral blood flow SPECT was studied in 22 cases(24 lesions) of brain tumor(3;metastasis,6;meningioma,2;malignant melanoma,3;low grade astrocytoma,3;high grade astrocytoma,2;craniopharyngioma,1;hemangioma,1;hemangioblastoma,1;chordoma). Each case was injected 3mCi of IMP intravenously. SPECT data were collected twice from 30 minutes and 4 hours after injection using rotating scintillation camera ECT system(ZLC 75). Low blood flow was observed in the area of peritumor edema as well as the tumor lesion in X-CT in 17 out of 24 lesions(71%) in the early IMP image. The undetected three lesions were small and/or located in the midline area. In two cases of meningioma and one of malanoma early images revealed high radioactivity of the lesions,but delayed images showed lower activity of the lesions than that of surrounding cerebral cortices. Tumor activity to cerebral cortical activity in the opposite side(T/N ratio) was calculated in each case. The T/N ratios were ranged from 44% to 132% and no tumor specificity was observed in these ratios.

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CLINICAL VALUE OF REGIONAL CEREBRAL PERFUSION SPECT WITH I-123 LABELED IMP IN BRAIN TUMORS.

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To evaluate early dynamics and late changes of IMP distribution in brain tumors and surrounding tissues, we performed serial SPECT scans, eight 2-min scan (dynamic scan) immediately after IMP administration and two 30-min scans at 20 min (early scan) and 5 hr (late scan), using a multi-detecter SPECT scanner. We also measured CBF using PET and O-15 labeled CO2 or H2O, and compared the distribution of IMP with CBF. Seven tumors out of 24 studies showed increased uptake of IMP on the dynamic scan, indicating high blood flow, but the activity decreased rapidly in the tumor and all tumors showed decreased uptake on the late scan. The initial distribution of IMP in the tumor showed similar pattern as CBF measured by PET. In the early scan, decreased uptake was observed in the more extended area than tumors visualized by XCT, probably indicating the area of edema. On the late scan, redistribution of the tracer was observed in the area of edema. Decreased uptake in the cortex on the early scan due to the transneuronal suppression also disappeared on the late scan. There was no redistribution of the tracer in the tumors.

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